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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/633,935

08/04/2003

Ronald E. Malmin

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7590

08/10/2005

Elsa Keller  
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EXAMINER

HANNAHER, CONSTANTINE

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SP

<b>Office Action Summary</b>	<b>Application No.</b> 10/633,935	<b>Applicant(s)</b> MALMIN, RONALD E.	
	<b>Examiner</b> Constantine Hannaher	<b>Art Unit</b> 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 May 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 and 18-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 18-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### **Information Disclosure Statement**

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### **Drawings**

2. The drawings were received on September 8, 2003. These drawings are acceptable.

### **Specification**

3. The amendment filed May 11, 2004 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: page 8, the total rotation angle of 180° and the (3 to 5)° increments; page 11, the scanning of cargo containers.

Applicant is required to cancel the new matter in the reply to this Office Action.

### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claim 20 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Zeng (US006762413B2).

With respect to independent claim 20, Zeng discloses a method of obtaining tomographic images (column 1, lines 12-13) of an object **200** (Fig. 6) corresponding to the illustrated gamma camera **B** (Fig. 1) which would comprise the steps of obtaining a plurality of sets of planar integral scintillation event data from the object **200** at a plurality of azimuth angles (column 8, lines 23-34) of a rotating scintillation detector (*e.g.*, Fig. 4 and column 7, lines 31-35) for each of a plurality of gantry angles of a gamma camera **22** (column 8, lines 6-21) and reconstructing the plurality of sets of planar integral scintillation event data to form a tomographic image of the object **200** (column 8, lines 43-56).

#### **Claim Rejections - 35 USC § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 2, 4, 22, 5, 7-10, 21, 11, 13-15, 18, 23-25, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) in view of Miraldi (US003688113A).

With respect to independent claim 1, Zeng discloses a gamma camera **22** comprising a plurality of bar detector strips **106** made of scintillating material (in the alternative embodiment in which the dimension  $C_y$  of detector elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, the fabrication from a scintillating material as described at column 7, lines 31-35 would constitute a “bar” within the meaning of the claim) arranged in a stack configuration (Fig. 4), at least

one photodetector coupled to the stack of bar detector strips **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of bar detector strips **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the stack of bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35). Miraldi shows (Fig. 7) that the optical communication between a bar detector **86** and a photodetector **96, 98** in a tomographic device (gamma camera) by coupling of the photodetector to an end of the bar detector strip has long been known. Since there are only six sides to a parallelepiped bar as shown by Zeng at **106** (or to a stack thereof) and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the stack or to the sides of the strips facing the collimator slats and in view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera **22** were coupled to at least one end of the stack of bar detector strips **106**.

With respect to dependent claim 2, Zeng discloses that each bar detector strip **106** is in optical communication with an appropriate photodetector (column 7, lines 31-35). accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made, in view of the suggestion of Miraldi, to modify the gamma camera **22** of Zeng to further comprise a plurality of photodetectors each coupled to at least one end of each bar detector strip **106** of the stack.

With respect to dependent claim 4, Zeng discloses that the photodetectors are photodiodes.

With respect to dependent claim 22, Miraldi suggests photodetectors 96, 98 are coupled to both ends of the bar detector strip 86. It would have been obvious to one of ordinary skill in the art at the time the invention was made to couple each of the bar detector strips 106 in the stack of the gamma camera 22 of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to dependent claim 5, Zeng discloses that the bar detector strips 106 are formed of CsI (column 7, line 34).

With respect to dependent claim 7, Zeng discloses each bar detector strip 106 is located between individual slats 102 of the slat collimator 100 (column 7, lines 23-26).

With respect to dependent claim 8, each of the individual slats 102 in the gamma camera 22 of Zeng has a length  $W_y$  matching the length  $C_y$  of the bar detector strips 106 (column 7, lines 45-48).

With respect to dependent claim 9, the slat collimator 100 in the gamma camera 22 of Zeng is mounted adjacent to the plurality of bar detector strips 106 (Fig. 4).

With respect to dependent claim 10, see the explanation of the rejection against claim 8, and further the spacing  $G$  between slats 102 of the slat collimator 100 in the gamma camera 22 of Zeng (Fig. 4) matches the dimension  $C_x$  of the bar detector strips 106 (compare with Fig. 8 where every other slat 102 is omitted and  $2C_x=2G$ ).

With respect to dependent claim 21, Miraldi suggests photodetectors 96, 98 are coupled to both ends of the bar detector strip 86. It would have been obvious to one of ordinary skill in the art at the time the invention was made to couple the stack of bar detector strips 106 in the gamma camera 22 of Zeng to at least a second photodetector at a second end of the stack as suggested by



Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 11, Zeng discloses a gamma camera 22 comprising a plurality of bar detector strips 106 made of scintillating material (in the alternative embodiment in which the dimension  $C_y$  of detector elements 106 is substantially the same as the dimension  $W_y$  of the slats 102, the fabrication from a scintillating material as described at column 7, lines 31-35 would constitute a “bar” within the meaning of the claim), at least one photodetector coupled to each bar detector strip 106 (column 7, lines 34-35), and a slat collimator 100 including a plurality of elongated slats 102 for collimating each of the plurality of bar detector strips 106 to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the bar detector strips 106 as a choice within the ordinary skill in the art (column 7, lines 34-35). Miraldi shows (Fig. 7) that the optical communication between a bar detector 86 and a photodetector 96, 98 in a tomographic device (gamma camera) by coupling of the photodetector to an end of the bar detector strip has long been known. Since there are only six sides to a parallelepiped bar as shown by Zeng at 106 and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the strip or to the sides facing the collimator slats and in view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating 92 as disclosed by Miraldi to guide light to the ends), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera 22 were coupled to an end of each of the bar detector strips 106.

With respect to dependent claim 13, Zeng discloses that the photodetectors are photodiodes.

With respect to dependent claim 14, Zeng discloses that the bar detector strips **106** are formed of CsI (column 7, line 34).

With respect to dependent claim 15, Zeng discloses each bar detector strip **106** is located between individual slats **102** of the slat collimator **100** (column 7, lines 23-26).

With respect to dependent claim 18, each of the individual slats **102** in the gamma camera **22** of Zeng has a length  $W_y$  matching the length  $C_y$  of the bar detector strips **106** (column 7, lines 45-48).

With respect to dependent claim 23, the slat collimator **100** in the gamma camera **22** of Zeng is mounted adjacent to the plurality of bar detector strips **106** (Fig. 4).

With respect to dependent claim 24, see the explanation of the rejection against claim 18, and further the spacing  $G$  between slats **102** of the slat collimator **100** in the gamma camera **22** of Zeng (Fig. 4) matches the dimension  $C_x$  of the bar detector strips **106** (compare with Fig. 8 where every other slat **102** is omitted and  $2C_x=2G$ ).

With respect to dependent claim 25, Miraldi suggests photodetectors **96, 98** are coupled to both ends of the bar detector strip **86**. It would have been obvious to one of ordinary skill in the art at the time the invention was made to couple each of the bar detector strips **106** in the gamma camera **22** of Zeng to a photodetector at both ends as suggested by Miraldi in order to avoid an artifact based on distance of the scintillation event from the one photodetector.

With respect to independent claim 19, Zeng discloses a method of obtaining tomographic images (column 1, lines 12-13) of an object **200** (Fig. 6) corresponding to the illustrated gamma camera **B** (Fig. 1) which would comprise the steps of obtaining a plurality of sets of planar integral scintillation event data from the object **200** at a plurality of azimuth angles (column 8, lines 23-34) of a rotating scintillation detector (*e.g.*, Fig. 4 and column 7, lines 31-35) for each of a plurality of gantry



angles of a gamma camera **22** (column 8, lines 6-21) and reconstructing the plurality of sets of planar integral scintillation event data to form a tomographic image of the object **200** (column 8, lines 43-56). The scintillation detector **22** includes a plurality of bar detector strips made of scintillating material (in the alternative embodiment in which the dimension  $C_y$  of detector elements **106** is substantially the same as the dimension  $W_y$  of the slats **102**, the fabrication from a scintillating material as described at column 7, lines 31-35 would constitute a “bar” within the meaning of the claim), at least one photodetector coupled to each bar detector strip **106** (column 7, lines 34-35), and a slat collimator **100** including a plurality of elongated slats **102** for collimating each of the plurality of bar detector strips **106** to receive gamma photons (column 1, lines 13-14) in only a single dimension (along dimension  $W_y$ ). Zeng leaves the specific arrangement of the optical communication of the appropriate photodetector to the bar detector strips **106** as a choice within the ordinary skill in the art (column 7, lines 34-35). Miraldi shows (Fig. 7) that the optical communication between a bar detector **86** and a photodetector **96**, **98** in a tomographic device (gamma camera) by coupling of the photodetector to an end of the bar detector strip has long been known. Since there are only six sides to a parallelepiped bar as shown by Zeng at **106** and those of ordinary skill in the art recognize that there is no opportunity to couple a photodetector to the incident radiation side of the strip or to the sides facing the collimator slats and in view of the good light collection from a long bar strip with end-coupled photodetectors (with reflective coating **92** as disclosed by Miraldi to guide light to the ends), it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Zeng to specify that the photodetectors in the gamma camera **22** were coupled to an end of each of the bar detector strips **106**.

8. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) and Miraldi (US003688113A) as applied to claims 2 and 11 above, and further in view of Iwanczyk *et al.* (US006521894B1).

With respect to dependent claims 3 and 12, the photodetectors in the gamma camera suggested by Zeng and Miraldi are “appropriate” (column 7, line 35). Iwanczyk *et al.* discloses that silicon drift detectors **11** (Fig. 1) are an appropriate photodetector for coupling to a scintillator **37** in a gamma detector **10**, especially to a CsI scintillator **53** (Fig. 4B) shaped as a rod. In view of the effective performance of silicon drift detectors in coupling to an elongated scintillation element as described by Iwanczyk *et al.*, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera **22** suggested by Zeng and Miraldi to specify that the appropriate photodetectors coupled to the stack of bar detector strips **106** (or to the strips themselves) was of the silicon drift detector type.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng (US006762413B2) and Miraldi (US003688113A) as applied to claim 1 above, and further in view of Shao (US006710349B2).

With respect to dependent claim 6, the photodetectors in the gamma camera suggested by Zeng and Miraldi are “appropriate” (column 7, line 35). Shao discloses that a position-sensitive photomultiplier tube **1** (Fig. 2) is an appropriate photodetector for coupling to a scintillator stack **9** in a gamma detector (column 1, lines 11-22) especially where the elements of the stack are shaped as a bar detector strip (column 1, line 53). In view of the effective performance of a PS-PMT in coupling to an elongated scintillation element as described by Shao, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gamma camera **22**

suggested by Zeng and Miraldi to specify that the appropriate photodetectors coupled to the stack of bar detector strips 106 was of the position-sensitive photomultiplier tube type.

**Response to Submission(s)**

10. The amendment filed May 11, 2004 has been entered.
11. This application has been published as US2005/0029461A1 on February 10, 2005.

**Conclusion**

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Constantine Hannaher whose telephone number is (571) 272-2437. The examiner can normally be reached on Monday-Friday with flexible hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Constantine Hannaher  
Primary Examiner